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ABSTRACT

The purpose of the study was to evaluate and improve the job inventory method of job analysis as applied to officer positions. Seven utilization fields were analyzed and inventories were constructed for another three fields. The basic finding was that the inventory method can be used operationally in the analysis of officer jobs if job analysts use specific approaches to task statement construction and if more front-end research than is usually needed for airman job inventories is performed prior to the finalization of a job inventory. No magic formulas for the construction of task statements exist; however, after heavy front-end work, the job analyst will obtain enough information to resolve the issues of task specificity and breadth of coverage for each utilization field on an individual basis. The report contains 30 statistical tables. (Author)

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EVALUATION OF THE JOB INVENTORY APPROACH IN ANALYZING USAF OFFICER UTILIZATION FIELDS

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June 1975
Final Report for Period 19 June 1972 – 28 July 1974

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Chief, Occupational and Manpower Research Division

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I. INTRODUCTION

The job inventory method of job analysis has been successfully applied to USAF enlisted career ladders for more than fifteen years (Christal, 1973); however, its use with officer utilization fields has been more recent and more experimental. Most of the attempts at officer job analysis prior to 1971 utilized a broad, behavioral approach to the construction of task statements. These past officer job inventories tended to favor task statements which were worded similarly to the executive job dimension statements of Hemphill (1960). Such statements adequately describe the behaviors required for performing work as an officer or an executive; however, the use of such statements as discriminators of sub-specialties within a utilization field usually fails. As will be documented in the present report, the use of broad, behaviorally oriented task statements in a job analysis usually shows that officers within a utilization field have few, if any, sub-specialties--even when the utilization field is known from other sources to have distinct segmentation. The general result of a broad behavioral approach to officer job analysis tells us what we already know; i.e., that the average officer "plans," "makes decisions," "controls," "executes," etc. Another disadvantage of broadly stated task statements is that, although it is possible to infer some general job requirements from them, it is difficult to determine which specific skills, knowledge, or background experiences are necessary for performance of the tasks.

The present report describes findings derived from the application of a modified method of task statement construction of task statements in the present effort was that the subject matter of the task to which the officer applies his skills must be documented in some detail. Questions addressed are as follows:

(1) Does a more detailed approach to officer job analysis reflect sub-specialization within utilization fields?

(2) Does a more detailed approach reflect the task structure and the character of various job types within a utilization field accurately?

(3) Can special semantic characteristics of task statements which are good discriminators of grade or job type be identified?

(4) Does the inventory method produce data which facilitates the study of complementary topics such as job satisfaction or career intent?

(5) How can the inventory method of job analysis facilitate the study of job difficulty?

(6) What can be done to improve the data collection process for job inventories in general?

(7) How does the job inventory method need to be modified for use with officer populations?

Basic data for the study were supplied from job inventories administered to members of seven utilization fields during the years 1971-72, as listed in Table 1. Because of administrative lag, the surveys were actually administered four to six months after the dates of publication. The actual job analysis report for each utilization field was also a product of the present effort. Tables 2, 3, and 4 show characteristics of the samples studied including grade, DAFSC, and assigned Major Command.

TABLE 1. LIST OF UTILIZATION FIELDS (AFSCs)
IN ORDER OF DATE OF PUBLICATION.

AFSC	AFPT	DATE OF PUBLICATION
Financial (67XX)	80-67XX-009	April 1971
Procurement Management (65XX)	80-65XX-008	May 1971
Aircraft Maintenance (40XX)	80-43XX-004	June 1971
Civil Engineering (55XX)	80-55XX-005	July 1971
Air Operations (14XX)	80-14XX-002	August 1971
Transportation (60XX)	80-60XX-006	August 1971
Supply Management (64XX)	80-64XX-007	January 1972

TABLE 2. GRADE DISTRIBUTIONS OF SAMPLES STUDIED.

	2nd LT	1st LT	CAPT	MAJ	LT COL	COL	Not Rcd	Total
AIRCRAFT MAINTENANCE (AFSCs 401X/2X/9X)	63 (7%)	235(24%)	362(37%)	128(13%)	133(14%)	32(3%)	16(2%)	969
AIR OPERATIONS (AFSCs 141X/3X)	0	0	140(9%)	685(45%)	647(42%)	37(2%)	31(2%)	1540
CIVIL ENGINEERING (AFSCs 55XX)	81 (8%)	138(14%)	425(43%)	191(19%)	90 (9%)	53(5%)	22(2%)	1000
FINANCIAL (AFSCs 67XX)	115(13%)	150(18%)	378(44%)	133(16%)	59 (7%)	7(1%)	8(1%)	850
PROCUREMENT MANAGEMENT (AFSCs 65XX)	42 (5%)	83(10%)	401(47%)	163(19%)	106(12%)	48(6%)	14(1%)	857
SUPPLY MANAGEMENT (AFSCs 64XX)	138(11%)	248(19%)	547(43%)	153(12%)	129(10%)	20(2%)	36(3%)	1271
TRANSPORTATION (AFSCs 60XX)	79(14%)	81(14%)	234(41%)	83(15%)	57(10%)	25(4%)	14(2%)	573

TABLE 3. DAFSC DISTRIBUTIONS OF SAMPLES STUDIED.

ACFT MAINT	AIR OPS	CIVIL ENG	FINANCIAL	PROCUREMENT MGMT	SUPPLY MGMT	TRANSPORTATION
n	n	n	n	n	n	n
4011-114 (12%)	1411- 85 (5%)	5511-114 (11%)	6711- 19 (2%)	6511-102 (12%)	6411-208 (16%)	6011- 90 (16%)
4016-192 (20%)	1416-901 (59%)	5516-262 (26%)	6716- 36 (4%)	6516-281 (33%)	6416-341 (27%)	6016-150 (26%)
4021-119 (12%)	1431- 40 (3%)	5521-178 (18%)	6721- 34 (4%)	6521- 29 (3%)	6421-104 (8%)	6021- 21 (4%)
4024-440 (45%)	A- 0	A- 7	6724-154 (18%)	6524- 83 (10%)	A- 90	6024- 94 (16%)
4091- 9 (1%)	B- 2	B- 11	6731- 19 (2%)	6531- 60 (7%)	D- 6	6041- 33 (6%)
4096- 69 (7%)	C- 3	C- 46	6736-111 (13%)	6534-293 (34%)	N/R- 8	6044-171 (30%)
	D- 1	D- 24	6741- 22 (3%)		6424-595 (47%)	
	E- 0	E- 21	6746- 31 (4%)		A-521	
	F- 3	F- 17	6781- 60 (7%)		D- 42	
	G- 4	Z- 50	6784-185 (22%)		N/R- 32	
	H- 1	N/R- 2	6791- 75 (9%)			
	J- 1	5525-414 (41%)	6796- 93 (11%)			
	L- 2	A- 23				
	M- 1	B- 14				
	Z- 14	C-130				
	N/R* 8	D- 53				
	1435-464 (30%)	E- 13				
	A- 10	F- 23				
	B- 8	Z-156				
	C- 56	N/R- 2				
	D- 3	5591- 3 (1%)				
	E- 15	5596- 17 (2%)				
	F- 45					
	G- 39					
	H- 12					
	J- 18					
	L- 1					
	M- 0					
	Z-204					
	N/R - 53					
N/R - 26 (3%)	N/R - 50 (3%)	N/R - 12 (1%)	N/R - 11 (1%)	N/R - 9 (1%)	N/R - 23 (2%)	N/R - 14 (2%)
TOTAL-969	TOTAL-1540	TOTAL-1000	TOTAL-850	TOTAL-857	TOTAL-1271	TOTAL-573

*N/R = Not Recorded

TABLE 4. ASSIGNED MAJOR COMMANDS OF SAMPLES STUDIED.

	AIRCRAFT MAINTENANCE	AIR OPERATIONS	CIVIL ENGINEERING	FINANCIAL	PROCUREMENT MANAGEMENT	SUPPLY MANAGEMENT	TRANSPORTATION
AAC	0	13 (1%)	37 (4%)	3 (-%)	1 (-%)	18 (1%)	8 (1%)
USAFA	0	0	8 (1%)	4 (1%)	0	6 (-%)	2 (-%)
ADC	64 (7%)	61 (4%)	53 (5%)	20 (2%)	22 (3%)	88 (7%)	13 (2%)
USAFE	69 (7%)	126 (8%)	99 (10%)	36 (4%)	16 (2%)	113 (9%)	46 (8%)
AFAFC	0	0	0	20 (2%)	0	0	0
AFLC	55 (6%)	14 (1%)	39 (4%)	16 (2%)	137 (16%)	54 (4%)	21 (4%)
ACIC	0	7 (-%)	3 (-%)	0	1 (-%)	3 (-%)	1 (-%)
AFSC	42 (5%)	75 (5%)	109 (11%)	36 (4%)	326 (38%)	32 (3%)	14 (3%)
ATC	71 (7%)	44 (3%)	112 (11%)	43 (5%)	41 (5%)	87 (7%)	34 (6%)
AU	0	0	22 (2%)	5 (1%)	10 (1%)	8 (1%)	3 (1%)
USAFSO	9 (1%)	29 (2%)	4 (-%)	3 (-%)	1 (-%)	9 (1%)	5 (1%)
AFRES	0	14 (1%)	1 (-%)	0	0	2 (-%)	3 (1%)
HQ USAF	27 (3%)	152 (10%)	62 (6%)	81 (10%)	33 (4%)	53 (4%)	15 (3%)
AFDAS		0	0	0	1 (-%)	0	1 (-%)
HQ COMD	20 (2%)	182 (12%)	49 (5%)	373 (44%)	101 (12%)	90 (7%)	30 (5%)
MAC	136 (14%)	156 (10%)	33 (3%)	23 (3%)	25 (3%)	105 (8%)	144 (25%)
PACAF	36 (4%)	186 (12%)	110 (11%)	66 (8%)	24 (3%)	128 (10%)	86 (15%)
SAC	210 (22%)	242 (16%)	141 (14%)	61 (7%)	64 (7%)	207 (16%)	74 (13%)
TAC	228 (24%)	215 (14%)	94 (10%)	49 (6%)	27 (3%)	189 (15%)	71 (12%)
USAFSS	0	1 (-%)	0	0	0	31 (2%)	0
OAR	0	0	0	0	1 (-%)	0	0
AFCS	1 (-%)	9 (-%)	18 (2%)	8 (1%)	9 (1%)	40 (3%)	2 (-%)
NOT RECORDED	1 (-%)	14 (1%)	6 (1%)	3 (-%)	17 (2%)	8 (1%)	0
TOTAL	969	1540	1000	850	857	1271	573

II. SOME OUTCOMES OF THE JOB ANALYSES

A. COMPARISONS OF THE PRESENT SEVEN WITH PAST ATTEMPTS AT OFFICER JOB ANALYSIS

Although it is not an exact comparison, a general attempt is made below to illustrate differences between past and present attempts at USAF officer job analysis. Task statements constructed for past job inventories tended to err in the direction of being too few and too general; present task statements tended to err in the direction of being too many and too specific. Past inventories had the following types of task statements:

(1) Monitor contractor quality control

(2) Plan training programs

(3) Communicate with industrial firms

(4) Participate as a member of a survey team

(5) Recommend plans or policies

(6) Develop administrative procedures

(7) Advise on transportation capacity

Present inventories offered the following types of statements as full or partial substitutes for the above:

(1) Monitor contractor compliance with sequence and flow schedules

(2) Determine training requirements in the procurement area

(3) Apportion mobilization production requirements among selected producers

(4) Conduct annual property system surveys

(5) Develop plans for specific systems procurements

(6) Establish custody and control procedures for supplies

(7) Analyze movement performance data to determine accuracy of forecasts

Direct comparisons of task statements are presented above; in addition, past and present attempts at officer job analysis can be compared statistically. Perhaps the most useful comparison statistic is a measure of group homogeneity called the "average overlap within a group" (Archer, 1966). For any utilization field studied, the "average overlap within" is an indicator of the degree of similarity of tasks performed by members of a single utilization field. The statistic can range from 0% (no similarity or homogeneity) to 100% (total homogeneity). A low value for a field would indicate diversity of job types within the field; a high value would indicate that many members perform the same tasks. If a field had only one or two job types, a survey of this field would produce a high overlap within. Table 5 compares four utilization fields which were surveyed under the past approach and later re-surveyed under the present approach (the Administrative [70XX] field is included because it was analyzed under both approaches, also). Table 5 also compares three other past surveys with three different present surveys in which re-survey was not accomplished. The average overlap value for seven past surveys is 34.9 percent; for seven present surveys, 18.5 percent. The present approach clearly produces more heterogeneous pictures of the utilization fields, since the "average overlap within" is substantially lower.

Other measures of homogeneity/heterogeneity are the percentage of the sample grouped into the largest job type and the number of job types identified. Table 6 shows that seven past surveys grouped an average of 42 percent of sample members into the largest job type while the corresponding percentage for present surveys was 12 percent. Also, present surveys identified almost twice as many job types per utilization field than did past surveys. Both measures clearly show increased heterogeneity of results with present inventories.

Another measure showing dissimilarity between the results of present and past approaches is the number of tasks on which performance was indicated by respondents. Table 7 shows a detailed analysis of this measure for the past and present analysis of the transportation (60XX) utilization field. Table 7 can be read in several ways, all of which point out that, in the past survey, the average sample member indicated performance of substantially more tasks than did members of the present survey sample. In the old sample, the median percentage of tasks checked was approximately 48 percent of the tasks in the inventory, while the median for new sample members was only 13 percent of the tasks.

TABLE 5. COMPARISON OF PAST AND PRESENT JOB ANALYSES IN TERMS OF THE AVERAGE PERCENT OVERLAP WITHIN EACH TOTAL SAMPLE.

UTILIZATION FIELD		AVERAGE % OVERLAP WITHIN EACH TOTAL SAMPLE	
PAST	PRESENT	PAST	PRESENT
Administrative (70XX)	Administrative (70XX)	38.0	25.7
Transportation (60XX)	Transportation (60XX)	48.2	14.7
Aircraft Maintenance (43XX)	Aircraft Maintenance (43XX)	51.4	20.9
Supply (64XX)	Supply (64XX)	18.4	21.1
	Financial (67XX)		15.1
	Civil Engineering (55XX)		15.5
	Air Operations (14XX)		16.5
Medical Services (90XX)		47.6	
Weather (25XX)		25.5	
Navigator-Observer (15XX)		15.3	
	AVERAGE	34.9	18.5

TABLE 6. OTHER COMPARISONS OF PAST AND PRESENT OFFICER JOB ANALYSES.

	(A) % OF THE SAMPLE GROUPED INTO THE LARGEST JOB TYPE		(B) # OF JOB TYPES IDENTIFIED	
	PAST	PRESENT	PAST	PRESENT
Supply (64XX)	66%	14%	12	12
Transportation (60XX)	18%	10%	19	19
Aircraft Maintenance (43XX)	85%	16%	9	25
Procurement (65XX)	38%	11%	13	33
Air Operations (14XX)		5%		38
Financial (67XX)		19%		18
Civil Engineering (55XX)		6%		26
Weather (25XX)	34%		21	
Personnel (73XX)	28%		12	
Navigator-Observer (15XX)	28%		5	
AVERAGE	42%	12%	13	24

TABLE 7. PAST AND PRESENT TRANSPORTATION (60XX) SURVEYS COMPARED IN TERMS OF NUMBER OF RESPONDENTS PERFORMING 91% OR MORE OF THE TASKS IN THE INVENTORY, 81-90%, 71-80%, ETC.

PERCENTAGE OF INDICATED PERFORMANCE RANGES	NON-CUMULATIVE FREQUENCIES OF PERFORMANCE WITHIN PERCENTAGE RANGE	
	PAST SURVEY	PRESENT SURVEY
91-100%	2	0
81-90%	13	0
71-80%	23	0
61-70%	36	6
51-60%	52	3
41-50%	55	5
31-40%	53	23
21-30%	37	77
11-20%	8	181
1-10%	3	209
TOTAL N	282	504
MEDIAN PERCENTAGE OF TASKS PERFORMED	48%	13%

Table 8 presents a summary of the capability of present and past transportation task statements to elicit differences in the grade levels of respondents. In the past survey, the task for which performers had the lowest grade average was separated from the highest "graded" task by a spread of 1.30 grade points; the present survey increased this figure to 2.28 points. The present survey nearly tripled the point spread for the middle 50 percent of tasks (0.57 vs. 0.21 for the old survey).

Similar grade ranges for the six other present surveys are displayed in Table 9. The air operations field contains no grades lower than captain; the other fields contain officers from all six grades.

The more detailed approach seems to produce more heterogeneous pictures of the utilization fields, to identify more job types, to produce more selective responses to task statements, and to produce greater differentiation among grades than does the more general approach used before 1971.

TABLE 8. AVERAGE GRADE OF PERSONS PERFORMING TASKS IN THE PAST AND PRESENT TRANSPORTATION (60XX) JOB ANALYSES: RANGE FOR ENTIRE SET OF TASKS AND RANGE FOR THE MIDDLE 50% OF TASKS. (GRADE CODE: 1 = 2ND LT., 6 = COLONEL)

	RANGE OF AVERAGE GRADES FOR ALL TASKS	DIFFERENCE	RANGE OF AVERAGE GRADES FOR MIDDLE 50% OF TASKS	DIFFERENCE
Past Analysis	2.77 - 4.07	1.30	3.26 - 3.47	0.21
Present Analysis	2.05 - 4.33	2.28	2.91 - 3.48	0.57

TABLE 9. AVERAGE GRADE OF PERSONS PERFORMING TASKS IN SIX PRESENT JOB ANALYSES: RANGE FOR ENTIRE SET OF TASKS IN EACH FIELD AND RANGE FOR THE MIDDLE 50% OF TASKS (GRADE CODE: 1 = 2ND LT., 6 = COLONEL)

UTILIZATION FIELD	RANGE OF AVERAGE GRADES FOR ALL TASKS	DIFFERENCE	RANGE OF AVERAGE GRADES FOR MIDDLE 50% OF TASKS	DIFFERENCE
Financial (67XX)	2.22-6.00	3.78	2.84-3.43	0.59
Procurement (65XX)	2.91-5.29	2.38	3.42-3.95	0.53
Civil Engineering (55XX)	2.58-4.74	2.16	3.14-3.69	0.55
Supply (64XX)	2.31-4.45	2.14	2.86-3.43	0.57
Aircraft Maintenance (43XX)	2.70-4.77	2.07	3.16-3.58	0.42
Air Operations (14XX)	4.18-4.75	0.57	4.34-4.47	0.13

B. VALIDATION OF JOB TYPES

As a validation procedure for the job typing, twenty-two career development officers, with broad knowledge of their individual utilization fields, were involved. Each was given the results of the job analysis of his particular utilization field and asked to complete a questionnaire assessing the accuracy of the job analysis. Table 10 presents the pooled judgments of these twenty-two officers, who represent six utilization fields.

In addition, each of the twenty-two officers was asked to make a specific determination on each job type identified through the research process. The average number of job types presented to each officer was twenty-three. Table 11 presents the overall merged results for six utilization fields at the time of data collection; Table 12 presents results at the time of the validation interviews, or approximately two years after the time of data collection.

The sample of raters (22) was not large enough to show reliable variations among utilization fields. The results presented below should not be construed to be a typical validity study with an objective criterion. The criterion was simply the degree to which the twenty-two officers reasoned that the job analyses were accurate in describing the task content of and the number and nature of job types in their individual utilization fields. In general, the job validation procedure showed that expert career development officers substantially agreed with the outcomes of the various job analyses.

TABLE 10. POOLED JUDGMENTS OF 22 CAREER DEVELOPMENT OFFICERS AS TO THE GENERAL ACCURACY OF JOB ANALYSES PERFORMED UPON THEIR UTILIZATION FIELDS.

IN MY OPINION, THE JOB ANALYSIS AS A WHOLE WAS:	PERCENTAGE:
(1) Very Accurate	9
(2) Generally Accurate	87
(3) Moderately Accurate	4
(4) Slightly Accurate	0
(5) Inaccurate	0
TOTAL	100

TABLE 11. POOLED JUDGMENTS OF 22 CAREER DEVELOPMENT OFFICERS AS TO THE ACCURACY OF IDENTIFICATION OF SPECIFIC JOB TYPES BY THE JOB ANALYSIS PROCEDURE AT THE TIME OF DATA COLLECTION.

AT THE TIME OF DATA COLLECTION, DID THE JOB TYPE...	% OF RESPONSES POOLED ACROSS JOB TYPES AND UTILIZATION FIELDS
Definitely Exist?	76
Probably Exist?	12
Possibly Exist?	11
Definitely Not Exist?	1
TOTAL	100

TABLE 12. POOLED JUDGMENTS OF 22 CAREER DEVELOPMENT OFFICERS AS TO THE ACCURACY OF IDENTIFICATION OF SPECIFIC JOB TYPES BY THE JOB ANALYSIS PROCEDURE TWO-THREE YEARS AFTER THE TIME OF DATA COLLECTION.

AT PRESENT, DOES THE JOB TYPE.....	% OF RESPONSES POOLED ACROSS JOB TYPES AND UTILIZATION FIELDS
Definitely Exist?	72
Probably Exist?	16
Possibly Exist?	11
Definitely Not Exist?	1
TOTAL	100

III. ANALYSIS OF THE DISCRIMINATIVE QUALITY OF TASK STATEMENTS

As suggested in Table 8, the present approach to job inventory construction was relatively successful in discriminating among officers of different grade. It would seem useful to analyze task statements from the present job inventories to determine the semantic characteristics of task statements which were good discriminators of grade. Such an analysis could lead to the development of guidelines for future construction of officer task statements. In addition, it would seem useful to analyze task statements which differentiated among job types of clusters of job types.

Since they were available for analysis at the time, data from the transportation and procurement job analyses were taken for study. Only two fields (instead of five or six) were considered because the research was intended to be exploratory rather than comprehensive.

A. GRADE DISCRIMINATION

Very few tasks in the transportation or procurement job inventories were performed more frequently by officers in the middle grade range; therefore, a statistic which reflected the directional linearity of the relationship between task performance and grade was chosen. The statistic chosen was the phi coefficient, which was computed for each task in the transportation and procurement job inventories. The resulting phi coefficient values ranged from -.14 to +.59 for procurement and from -.17 to +.47 for transportation. Phi coefficient values which were less than or equal to -.11 or greater than or equal to +.11 were statistically significant ($p < .01$).

Of the 503 tasks in the transportation inventory, 145 were statistically significant in discriminating grade; of the 517 tasks in the procurement inventory, 165 significantly discriminated among grades.

The large majority of tasks were not significant discriminators of grade; however, they were not necessarily inferior task statements. Some tasks tend to be performed by all grade levels, and it was not the intent of inventory constructors to utilize only tasks which appeared to be good discriminators of grade.

Due to the large number of tasks in the inventories, a method was developed in order to examine more carefully the semantic characteristics of a smaller number of tasks. It was decided to analyze task statements with extreme phi coefficients. The task statements were scanned and those with very high or very low phi coefficients were compared with tasks with phi coefficients of zero.

Several of the tasks selected according to this criterion were performed by a very small percentage of the total sample. For greater reliability, those tasks performed by fewer than 5 percent of the total sample were eliminated from the analysis.

Tables 13 through 18 display those tasks which were the best positive grade discriminators (higher graded officers performed the tasks more frequently), the best negative grade discriminators (lower graded officers performed the tasks more frequently) and the worst grade discriminators (a group whose phi coefficients are not listed because they were all zero) for the procurement and transportation fields.

TABLE 13. THE TWENTY-FIVE BEST POSITIVE DISCRIMINATORS OF GRADE FROM THE PROCUREMENT JOB INVENTORY.

TASK	PERCENT MEMBERS PERFORMING, BY GRADES						PHI COEFFICIENT
	2nd Lt	1st Lt	Capt	Maj	Lt Col	Col	
O14 Prepare Officer Effectiveness Reports	5	1	14	53	80	92	.59
O 7 Interview Prospective Employees	2	19	27	58	81	85	.45
C10 Manage TDY Funds	7	5	9	35	49	77	.44
O 1 Approve Leaves and Passes	10	30	35	65	88	98	.44
O 9 Make Civilian Personnel Appraisals	2	25	28	61	75	92	.44
O11 Make Personnel Assignments	0	16	25	55	72	81	.43
O16 Recommend Personnel for Incentive Awards	5	22	28	60	81	85	.40
O 4 Develop Career Progression Plans for Personnel	2	17	22	51	64	58	.38
A 4 Answer Inspector General or GAO Reports	12	28	46	71	85	90	.37
O15 Process Civilian Grievances and Appeals from Adverse Actions	0	7	9	29	42	63	.37
C 3 Develop and Maintain Career Development and Internal Training Programs	2	19	21	52	55	60	.36
O 5 Develop Criteria for Job Descriptions	5	24	30	61	68	60	.36
A17 Determine Training Requirements in the Procurement Area	12	27	32	58	71	75	.34

TABLE 13. Continued.

TASK	PERCENT MEMBERS PERFORMING, BY GRADES 2nd Lt	1st Lt	Capt	Maj	Lt Col	Col	PHI COEFFICIENT
O12 Perform Civilian Upgrade or Downgrade Procedures	0	8	18	38	51	63	.34
A50 Review Auditor General Reports	5	13	28	46	65	77	.33
C 5 Develop Procurement or Production Management Objectives	7	7	17	40	45	56	.33
C13 Prepare Management Reports	10	33	38	67	65	69	.31
C14 Review Findings of Purchasing System Surveys	0	4	8	19	39	46	.31
O10 Make Manpower Surveys	2	8	12	35	36	44	.31
A31 Monitor Staff Surveillance Over Price or Cost Analysis	0	4	8	20	33	48	.30
C 2 Determine Impact of Accepting or Relinquishing Contract Administration Responsibility	0	6	10	24	37	46	.30
A24 Keep Commander Informed of the Status of Procurement Functions	17	30	49	71	70	73	.27
A27 Make Recommendations for Revising Armed Services Procurement Regulation	5	12	16	33	43	44	.27
A45 Prepare Responses to Congressional Inquiries Pertaining to Procurement	7	14	20	38	45	52	.27
C11 Prepare and Submit Budgets for Internal Operations of Procurement Activity	2	14	16	34	37	58	.27

TABLE 14. THE ELEVEN BEST NEGATIVE DISCRIMINATORS OF GRADE FROM THE PROCUREMENT JOB INVENTORY.

TASK	PERCENT MEMBERS PERFORMING, BY GRADE						PHI COEFFICIENT
	2nd Lt	1st Lt	Capt	Maj	Lt Col	Col	
L 1 Analyze Contractor Engineering Costs	29	28	24	15	19	13	-.11
L 3 Analyze Contractor Indirect Expenses	31	27	29	19	20	19	-.11
S 2 Coordinate With Requesting Personnel to Modify Specs, Nomenclature or Descriptions on Base Procurements	26	29	20	17	11	4	-.11
S32 Prepare RFP's, RFQ's or IFB's on Base Procurements	21	22	11	8	6	2	-.11
L 5 Analyze Contractor Material Costs	26	27	32	21	22	13	-.12
L 6 Analyze Contractor Profit	26	27	32	20	21	19	-.12
A38 Prepare Commerce Business Daily Synopses	40	33	20	15	16	6	-.12
A11 Conduct Contract Negotiations	33	45	46	36	32	13	-.13
A46 Prepare Solicitations Such as IFB, RFQ or RFP	52	42	28	22	22	10	-.13
A35 Prepare and Execute Contracts	38	36	34	25	25	2	-.14
L16 Develop Cost and Profit Negotiation Objectives	31	28	29	17	19	10	-.14

TABLE 15. THE TWENTY-FIVE POOREST DISCRIMINATORS OF GRADE FROM THE PROCUREMENT JOB INVENTORY.

TASK	PERCENTAGE MEMBERS PERFORMING, BY GRADE					
	2nd Lt	1st Lt	Capt	Maj	Lt Col	Col
A 3 Analyze the Impact of Changed Requirements to Assure Timely Award	55	51	61	55	50	40
A36 Prepare Balance of Payment Exceptions	5	4	9	6	13	6
D19 Issue Work Requests Under Maintenance, Overhaul or Modification Contracts	5	7	6	7	9	2
F16 Issue Discrepancy Reports to Contractor For Correction of Quality Discrepancies	2	11	8	9	10	10
L 7 Analyze Contractor Special Tooling Costs	17	13	18	17	19	10
L26 Review Contractor Pricing and Estimating Methods	14	10	18	15	19	19
M 2 Analyze Cost Information Reports	10	6	8	11	16	8
M 6 Evaluate and Adjust Contract Funds Requirements	10	10	11	12	10	4
N 9 Monitor Bid Management and Opening	7	22	17	17	17	13
P 3 Analyze Systems Procurement Packages for Completeness and Program Effectiveness	10	1	5	9	9	8
P 8 Coordinate Procurement Efforts to Insure Compatibility of Sub-System Technical Requirements	10	0	3	5	7	4

TABLE 15. Continued.

TASK	PERCENT MEMBERS PERFORMING, BY GRADE					
	2nd Lt	1st Lt	Capt	Maj	Lt Col	Col
Q 3 Analyze R & D Work Statements For Completeness and Impact on Procurement	5	10	8	10	9	8
Q 4 Conduct Pre-PR, Pre-Negotiation or Pre-Proposal Conferences on R & D Procurements	7	10	7	9	8	4
Q 5 Consult with Resource Activities to Correct Inadequate Solicitations on R & D Procurements	5	5	3	6	8	4
Q 7 Determine Need for Pre-Award Surveys or Cost or Price Analysis on R & D Procurements	5	8	8	9	8	4
Q18 Negotiate Individually with Potential Contractors for R & D Procurements	5	8	8	8	6	2
Q23 Process R & D Contract Changes or Modifications	5	11	9	10	8	4
R11 Gather Facts to Challenge High Prices on Central Procurements	10	5	9	6	7	15
R21 Negotiate Individually with Potential Contractors for Central Procurements	7	5	7	3	8	6
R22 Obtain Oral Quotations on Small Purchases	10	6	5	6	5	4
R24 Perform Buyer Follow-On Actions For Central Procurements	7	6	6	5	4	4

TABLE 15. Continued.

TASK	PERCENT MEMBERS PERFORMING, BY GRADE					
	2nd Lt	1st Lt	Capt	Maj	Lt Col	Col
R26 Prepare and Coordinate Plans for Specific Central Procurements	5	5	6	2	7	8
T 4 Decide on "Set Asides" and Classes of Base Contracts to be Advertised or Distributed to Small Business	10	8	8	13	10	2
U 5 Monitor Inclusion of Prospective Contractors on the Bidders' Mailing List	12	17	16	13	15	10
U 7 Review PR's for Small Business Participation	12	13	12	12	13	6

TABLE 16. THE TWENTY-FIVE BEST POSITIVE DISCRIMINATORS OF GRADE FROM THE TRANSPORTATION JOB INVENTORY.

TASK	PERCENT MEMBERS PERFORMING, BY GRADE 2nd Lt	1st Lt	Capt	Maj	Lt Col	Col	PHI COEFFICIENT
G13 Prepare Officer Effectiveness Reports	5	7	33	66	77	76	.47
E32 Make Field Assistance Visits to Subordinate Units on Transportation Matters	5	7	26	47	46	68	.33
E50 Prepare and Present Briefings for Military Staff Personnel on Transportation Matters	9	14	35	61	51	64	.31
E41 Participate in Development of Command Transportation Aspects of Emergency Plans	3	1	15	36	35	36	.31
E51 Prepare Broad Transportation Estimates for Command Operational Plans	0	1	9	24	30	24	.29
E58 Review and Evaluate Logistic Plans in Support of Command Deployments	3	4	13	31	26	36	.26
E 2 Advise Commander on Command Transportation Capabilities and Requirements	13	7	18	40	42	24	.26
E31 Investigate and Prepare Replies to Congressional or Presidential Inquiries	11	7	26	36	47	56	.25
E61 Review Special Congressional or Presidential Directives	3	0	8	18	19	44	.25

TABLE 16. Continued.

TASK	PERCENT MEMBERS PERFORMING, BY GRADE						PHI COEFFICIENT
	2nd Lt	1st Lt	Capt	Maj	Lt Col	Col	
E54 Program Transportation Resources to Insure Command Support of Air Force Mission Requirements	0	1	9	24	30	24	.24
A119 Provide Policy Guidance on Use of Airlift	6	9	23	36	42	40	.24
E 7 Attend Conferences and Critiques at Major Command or HQ USAF to Discuss Procedural Problems and Proposed Changes in Transportation Regulations	5	10	25	33	44	48	.23
E11 Coordinate Joint Use of Transportation Facilities and Carriers With Other Military Services	3	7	9	23	25	24	.23
E13 Coordinate With Other Military Services on Development of Standardized Management and Operational Systems	0	2	7	22	12	24	.23
E43 Perform Joint Military Planning on Commercial and Military Airspace Requirements and Capabilities	0	1	6	17	16	20	.23
E45 Plan and Monitor Command Transportation Training Programs	0	0	7	18	18	16	.23
E57 Represent the Air Force Before National Transportation Associations	1	1	3	13	5	36	.23
F 1 Analyze and Justify Command Transportation Financial Submissions and Budgets	0	2	9	19	19	28	.22

TABLE 16. Continued.

TASK	PERCENT MEMBERS PERFORMING, BY GRADE						PHI COEFFICIENT
	2nd Lt	1st Lt	Capt	Maj	Lt Col	Col	
E 9 Command a Transportation Squadron	1	4	13	27	30	8	.22
A28 Coordinate With Military Sealift Command on Transportation Matters	4	6	10	22	23	28	.21
E 6 Arrange Administrative Airlift Support for Distinguished Visitors	1	0	9	19	19	20	.21
E46 Plan and Recommend Changes to Manpower Personnel Assignment Document	6	6	20	35	30	28	.21
A43 Develop and Monitor Service Tests on New Transportation Concepts	4	4	8	17	14	44	.20
E30 Inspect Operating Activities to Determine Status of Training	13	11	22	35	37	40	.20
A123 Recommend or Establish Transportation Embargo Overseas	0	1	5	12	14	20	.20

TABLE 17. THE TWENTY-FIVE BEST NEGATIVE DISCRIMINATORS OF GRADE FROM THE TRANSPORTATION JOB INVENTORY.

TASK	PERCENT MEMBERS PERFORMING, BY GRADE 2nd Lt	1st Lt	Capt	Maj	Lt Col	Col	PHI COEFFICIENT
C126 Supervise Operation of Passenger Service Activities such as Passenger Processing, Dependents' Lounge, and Baggage Processing	13	20	17	5	2	24	-.13
C123 Serve as Supplies and Equipment Custodian	5	9	10	2	2	0	-.13
C 24 Coordinate With Aircraft Commander on Classified, Dangerous, or Other Special Cargo	11	27	23	10	11	12	-.13
B 97 Serve as TRCO for Vehicle Maintenance Contract Surveillance	11	16	9	2	5	0	-.13
B 58 Maintain Liaison with Local Civilian Highway Authorities Concerning Movement of USAF Vehicles	13	22	12	7	5	0	-.13
B 36 Direct Maintenance Control Functions	18	31	17	11	11	0	-.13
B 3 Advise Unit Transportation Chief on Motor Vehicle Problems and Capabilities	37	44	25	23	16	8	-.13
G 2 Conduct On-The-Job Training in Transportation Activities or Related Career Areas	44	44	38	25	30	16	-.14
C132 Supervise Transmission of Aircraft Departure Messages	10	19	13	4	2	8	-.14

TABLE 17. Continued.

TASK	PERCENT MEMBERS PERFORMING, BY GRADE						PHI COEFFICIENT
	2nd Lt	1st Lt	Capt	Maj	Lt Col	Col	
C 58 Direct the Dispatch and Maintenance of Air Terminal Vehicles and Loading Equipment	20	19	20	7	9	12	-.14
B 98 Supervise Credit Card Issuance and Record Keeping	27	25	9	5	9	0	-.14
B 74 Operate a Vehicle Abuse-Misuse Program	42	42	29	25	18	8	-.14
B 61 Maintain Records on Driver Training and Vehicle Operations	27	32	20	14	9	8	-.14
A 90 Monitor Accessorial Charges Resulting from Household Goods Movements and Certify That Services Were Performed	15	11	9	2	4	0	-.14
C128 Supervise or Assist with Passenger Loading, Off-Loading, or Protocol	22	23	21	7	7	20	-.15
C100 Obtain Signatures From Aircrews on Control Documents	10	19	17	6	2	8	-.15
C 39 Coordinate With Mess Halls on Feeding Passengers During Non-Normal Duty Hours	9	9	12	2	2	0	-.15
C 10 Brief Aircrew Personnel on Cargo Load, Type of Cargo and Destination	10	23	21	11	2	8	-.15
B 79 Prepare Unsatisfactory Reports on Parts and Materials	16	23	15	8	5	0	-.15
A 16 Certify Services Performed on Packing and Crating, Drayage or Storage Contracts	19	12	13	6	0	4	-.15

TABLE 17. Continued.

TASK	PERCENT MEMBERS PERFORMING, BY GRADE						PHI COEFFICIENT
	2nd Lt	1st Lt	Capt	Maj	Lt Col	Col	
A 11 Approve Transportation Requests, MAC Transportation Authorizations, or Meal Tickets	23	19	17	8	7	4	-.15
C104 Perform Ramp Monitoring Functions	14	22	21	8	4	8	-.16
B 54 Investigate and Prepare Reports on Misuses, Damages, or Accidents Involving Government Vehicles	42	47	31	24	21	8	-.16
C 20 Coordinate On-Loading and Off-Loading of Aircraft to Insure Timely Departure	30	36	34	17	14	24	-.17
G 7 Establish On-The-Job Training Programs for Transportation Personnel	49	44	44	25	35	12	-.17

TABLE 18. THE TWENTY-FIVE POOREST DISCRIMINATORS OF GRADE FROM THE TRANSPORTATION JOB INVENTORY.

TASK	PERCENT PERFORMING, BY GRADE 2nd Lt	1st Lt	Capt	Maj	Lt Col	Col
A 20 Compile Information on Installation Transportation Capabilities Under Emergency Conditions	22	14	26	19	25	28
A 40 Determine Air Eligibility of Export Cargo Based on Urgency of Need	14	6	14	10	12	20
A 64 Evaluate Household Goods Packing and Crating Contracts and Carrier Performance	20	11	15	13	19	16
A 71 Furnish Official Travel Information to Personnel or Dependents	27	15	24	25	18	24
A 99 Monitor Inspections of Household Goods Shipments	23	12	14	14	14	16
A104 Monitor Selection and Use of Carriers in Terms of Priority of Movement of Materiel and Personnel	15	9	14	16	11	8
A146 Route Emergency Shipments	13	10	15	11	18	8
B 18 Coordinate Vehicle Maintenance with Support Base	19	30	20	27	14	16
B 33 Develop or Operate a Vehicle Spotter Program	29	36	25	28	26	16
B 34 Develop or Supervise a Vehicle Maintenance Quality Control Program	19	28	22	28	26	16

TABLE 18. Continued.

TASK	PERCENT PERFORMING, BY GRADE					
	2nd Lt	1st Lt	Capt	Maj	Lt Col	Col
B 44 Establish Target Dates for Completion of Repairs on Off-Season Vehicles and Equipment	13	21	18	19	21	8
B 53 Inspect Vehicle Operating Activities to Determine Status of Training, Condition of Facilities or Effectiveness of Services Rendered	27	35	25	31	26	20
B 59 Maintain Liaison with Other Commands or Military Services on Vehicle Technical Matters	15	23	13	20	12	16
B 72 Monitor Vehicle Operator Maintenance	35	46	32	39	28	24
B100 Validate Vehicle Rental Budgets	13	16	12	16	14	12
C 35 Coordinate With Customs, Immigration or Public Health Officials to Insure Compliance with U.S. or Foreign Laws	22	25	28	24	25	36
C 41 Coordinate with Passenger Reservation Center for Passenger Booking Reservations	24	20	25	27	18	28
C 81 Maintain Liaison With Federal Border Clearance Agencies on Passport, Border Clearance or Customs Requirements	15	14	21	17	12	20
C 99 Notify Base Officials Concerning Arrival or Departure of Distinguished Visitors	8	12	14	13	5	12

TABLE 18. Continued.

TASK	PERCENT PERFORMING, BY GRADE					
	2nd Lt	1st Lt	Capt	Maj	Lt Col	Col
C109 Prepare Justification for New Air Terminal Equipment and Supplies	11	9	21	17	12	24
C118 Request Routing of Aircraft Through Airlift Control According to Load Plans	6	15	13	14	9	12
C138 Welcome Visiting Officials Arriving at Air Terminal and Refer Them to Appropriate Personnel or Places	10	12	15	11	11	20
E 64 Supervise Transportation Support of Mobility Exercises	20	19	21	24	18	16
G 8 Indoctrinate Newly Assigned Personnel	66	68	64	69	72	56
G 10 Plan and Coordinate Leaves or Vacations	65	68	62	71	68	64

In general, few systematic ways are evident in which the good grade discriminators differ from the bad grade discriminators. Bad grade discriminators may have more words per task statement; the presence of specific types of verbs or direct objects seems to be randomly distributed through both good and bad grade discriminators, however,

The key in understanding the nature of a good grade discriminator comes from an analysis of whether high - or low - graded officers checked the good grade discriminators at a higher rate. Merging the results of both utilization fields, the large majority of tasks identified as good grade discriminators were checked more often by officers in the top three grades (major, lieutenant colonel, and colonel), than by lower-graded officers. A closer look at the good grade discriminators shows that these same tasks were more generally worded; e.g., "Prepare management reports," "Approve leaves and passes," "Inspect operating activities to determine status of training," etc.

Apparently, the following type of mechanism is operative. Past attempts at officer job analysis have incorporated the use of broad, general task statements. These past attempts have not produced much differentiation among respondents of different grades. The present attempt incorporated elaborately stated, more specific task statements for the most part; however, some generally stated "management" tasks were sprinkled through the inventories. These generally stated "management" tasks turned out to be the best discriminators of grade, but only because higher-graded officers checked them more frequently than lower-graded officers. Possibly, in past surveys, the lower-graded officers would indicate performance on many of the generally stated "management" tasks because the entire inventory was composed of this type of tasks.

B. DISCRIMINATORS OF JOB TYPE CLUSTERS

In order to determine the degree of relationship between the percentage of incumbents performing each task and the major job type clusters into which the incumbents were grouped by the job analysis, chi-square values were computed for each task statement for the four major clusters discovered in the transportation analysis and the five major clusters discovered in the procurement job analysis. Chi-squares were used instead of phi coefficients because no linear relationships were expected between cluster membership and task performance. The resulting chi-square values ranged from 0.61 to 281.47. At a confidence level of .025, over 85 percent of the tasks in either job inventory were significant discriminators of major job type clusters.

Tasks with high chi-square values were compared to those with low chi-square values to determine any semantic differences. There were none except for the fact that tasks performed at a high frequency by members of a given cluster were quite appropriate for that cluster; e.g., members of the procurement cost and price analysis cluster checked many cost and price analysis tasks. Those tasks which were chosen to illustrate differences between the major job type clusters for the two utilization fields are displayed in Tables 19 and 20.

There seem to be no other systematic differences in the task statements discriminating major job type clusters. Apparently, the skill of the job analyst in assuring full coverage of the task universe of the utilization field is much more important than is discovering a formula for the semantic nature of the ideal task statement.

TABLE 19. TASKS CHOSEN TO ILLUSTRATE DIFFERENCES IN MAJOR JOB TYPE CLUSTERS FROM THE PROCUREMENT JOB INVENTORY. (STATISTIC: PERCENT MEMBERS PERFORMING)

		CLUSTER TITLE				
DUTY-TASK	GRP:	PROCUREMENT CHIEFS, BASE LEVEL	6516's	STAFF PROCUREMENT, MAJCOM HQ	PRODUCTION CHIEFS	COST AND PRICE ANALYSIS
		166	139	104	193	123
A-9 Assure procurement support of supply, maintenance or civil engineering mission		(96)	33	32	18	9
S-2 Coordinate with requesting personnel to modify specs, nomenclature or descriptions on base procurements		(91)	1	2	0	1
S-5 Direct negotiation teams for base procurements		(77)	1	2	0	1
S-6 Evaluate proposals, quotations or bids for base procurements		(84)	1	5	2	1
S-15 Mediate disputes between engineering inspectors and construction contractors		(75)	0	0	0	0
S-16 Monitor bid management and opening for base procurements		(85)	2	0	0	0
S-34 Review and sign base contracts		(78)	1	2	0	0
T-1 Advise base activities on procurement regulatory requirements		(91)	8	10	0	1
A-17 Determine training requirements in the procurement area		63	(80)	41	73	23

TABLE 19. Continued.

DUTY-TASK	GRP:	CLUSTER TITLE: PROCUREMENT CHIEFS, BASE LEVEL 166	6516's 139	STAFF PROCUREMENT, MAJCOM HQ 104	PRODUCTION CHIEFS 193	COST AND PRICE ANALYSIS 123
A-50 Review Auditor General reports		63	(70)	56	52	16
B-1 Assist division chiefs or contracting officers in the resolution of complex procurement problems		56	(71)	59	50	50
O-1 Approve leaves and passes		85	(95)	24	90	17
O-14 Prepare officer effectiveness reports		47	(85)	15	67	7
A-18 Develop command procurement policies and implementing directives		8	52	(90)	12	5
A-25 Maintain liaison between HQ USAF procurement staff and command field activities		12	38	(90)	7	6
A-27 Make recommendations for revising armed services procurement regulation		30	40	(78)	37	11
B-3 Coordinate procurement policy with AFLC, AFSC or HQ USAF		6	37	(63)	10	7
A-28 Make staff procurement assistance visits		14	46	(80)	22	6
A-52 Review contractor performance records		77	52	17	(90)	44

TABLE 19. Continued.

DUTY-TASK	GMP:	CLUSTER TITLE: PROCUREMENT CHIEFS BASE LEVEL 166	6516's 139	STAFF PROCUREMENT, MAJCOM HQ. 104	PRODUCTION CHIEFS 193	COST AND PRICE ANALYSIS 123
E-3	Assess strike impact on production deliveries	14	13	5	(85)	12
E-13	Evaluate contractor ability to meet changing delivery requirements	8	12	2	(82)	15
E-20	Evaluate pre-award surveys	25	22	5	(83)	24
I-2	Develop procedures for production surveillance and delinquency control	2	8	2	(80)	5
L-1	Analyze contractor engineering costs	13	1	10	32	(90)
L-4	Analyze contractor labor rates	35	5	15	35	(85)
L-5	Analyze contractor material costs	33	4	10	38	(89)
L-6	Analyze contractor profit	30	4	17	33	(88)
L-16	Develop cost and profit negotiation objectives	23	4	7	18	(88)

TABLE 20, TASKS CHOSEN TO ILLUSTRATE DIFFERENCES IN MAJOR JOB TYPE CLUSTERS FROM THE TRANSPORTATION JOB INVENTORY. (STATISTIC: PERCENT MEMBERS PERFORMING)

	CLUSTER TITLE			
DUTY-TASK	VEHICULAR MAINTENANCE AND OPERATIONS	TRAFFIC MGT	COMMAND STAFF	AERIAL PORT
GRP:	22	62	45	30
B-17 Coordinate vehicle authorization, distribution and disposal with other staff agencies	(73)	18	13	11
B-19 Coordinate vehicle operation, maintenance and budget programs	(76)	18	5	10
B-25 Coordinate with vehicle utilization and authorization board on vehicle requirements, assignment or utilization	(74)	7	3	12
B-47 Evaluate management reports on vehicle operations and maintenance	(81)	14	2	6
B-52 Inspect vehicle fleet to insure vehicles are in safe and serviceable operating condition	(82)	10	3	24
A- 6 Advise using activities of availability, limitations or requirements of various methods of transportation	27	(82)	54	30
A-13 Assist in tracing or expediting shipments	16	(88)	46	34

TABLE 20, Continued.

DUTY-TASK	GRP:	CLUSTER TITLE: VEHICULAR MAINTENANCE AND OPERATIONS	TRAFFIC MGT	COMMAND STAFF	AERIAL PORT
		22	62	45	30
A-27 Coordinate with MAC on transportation matters		15	(82)	70	45
A-76 Interpret entitlements for passenger travel and for movement or storage of personal property		14	(83)	21	10
A107 Monitor the preparation, issuance, distribution and accomplishment of government bills of lading		11	(58)	5	3
A119 Provide policy guidance on use of airlift		6	50	(79)	18
E 32 Make field assistance visits to subordinate units on transportation matters		19	32	(85)	13
E-42 Perform follow-up actions on Inspector General discrepancies or special subject matters		50	61	(72)	39
E-50 Prepare and present briefings for military staff personnel on transportation matters		29	42	(87)	21
E-29 Inspect operating activities to determine condition of facilities and equipment and effectiveness of transportation services		32	32	(41)	18
C-78 Insure coordination between traffic control and airlift command post, airlift control element or base operations for airlift mission control		4	18	25	(73)

TABLE 20, Continued.

DUTY-TASK	GRP:	CLUSTER TITLE: VEHICULAR MAINTENANCE AND OPERATIONS 22	TRAFFIC MGT 62	COMMAND STAFF 45	AERIAL PORT 30
C -4 Advise commander on aerial port terminal matters		6	19	51	(75)
C-20 Coordinate on-loading and off-loading of aircraft to insure timely departure		5	33	16	(93)
C-68 Identify and resolve problems relating to air terminal management		6	32	51	(75)

IV. POSSIBLE DETERMINANTS OF JOB SATISFACTION AND CAREER INTENT

A. IMPORTANCE OF CAREER MOTIVATION INFORMATION

Career motivation information is of importance to the Air Force for both recruitment and retention of officers. Sociological factors contribute to the problem of recruitment and retention. Public attitude toward the military as a career generally serves as a deterrent to recruitment efforts. According to Lang (1964), the past existence of the draft helped to generate volunteers for the services other than the Army, although these recruits may not have been career motivated. With the threat of the draft removed, recruitment problems may become more acute.

Yet another problem of recruitment and retention is caused by the changing nature of the supply and demand of highly trained personnel and changing levels of employment. Vroom (1964) states that if the probability of resignation is affected not only by job satisfaction but also by the availability of other positions, one should find higher turnover in times of full employment than in times of considerable unemployment.

The Air Force, in comparison with other military services, has a higher percentage of technical jobs which require a great deal of training for recruits. The average training cost for commissioned officers (Culclasure, 1971) is extremely high; it is evident that the retention of trained officers should be an important Air Force priority.

According to Lang (1964), the transfer value of military experience to civilian employment is also responsible for many retention problems. Another related problem is that as their education levels rise, the proportion of officers displaying less career interest also rises (Culclasure, 1971). Thus, as the educational level of the population in general increases, the officer retention problem may also increase.

It would seem important for Air Force recruiters to take these factors into account.

B. VARIABLES STUDIED IN PRESENT OFFICER JOB ANALYSES

As a by-product of the job inventory method of job analysis, it was possible to examine the respondents' expressed job satisfaction and stated career intent in relation to biographical and work performance variables. The job satisfaction and career intent variables used in this research were taken from the background information sections of job inventory responses from members of several different utilization fields.

Job satisfaction was measured by responses to the following 7-point scale:

I Find My Job (check one):

1 = Extremely dull
2 = Very dull
3 = Fairly dull
4 = So So
5 = Fairly interesting
6 = Very interesting
7 = Extremely interesting

For the purposes of the present study, stated "job interest" was chosen as the index of job satisfaction and will hereinafter be referred to as "job satisfaction."

The following 4-point scale was selected for the assessment of career intent:

I Plan to Remain in USAF Until Retirement:

1 = No
2 = Uncertain, probably no
3 = Uncertain, probably yes
4 = Yes

For given criterion groups in the study, the percentage of officers indicating that they would or probably would retire was chosen as the measure of career intent.

A wide variety of background variables were obtained from each of the 7 individual job analyses. The following paragraphs present discussions of many of them.

One question asked in all job inventories was based on Hemphill's (1960) research on the dimensions of executive positions. The question included nine dimensions or broad work areas and was a modified version of Hemphill's ten dimensions of executive positions. The rating scale is also

a modified version of Hemphill's. Cragun and McCormick (1967) reported that Air Force officers considered the scale satisfactory in rating their jobs. The question as it appears in the inventories is presented as follows:

LISTED BELOW ARE 9 BROAD WORK AREAS. IN THE BOXES, RATE YOUR JOB ON EACH WORK AREA.

USE THIS RATING SCALE:

0 = NOT PART OF MY PRESENT JOB
1 = AN EXTREMELY SMALL PART OF MY JOB
2 = A VERY SMALL PART OF MY JOB
3 = A SMALL PART OF MY JOB
4 = A FAIRLY SUBSTANTIAL PART OF MY JOB
5 = A LARGE PART OF MY JOB
6 = A VERY LARGE PART OF MY JOB
7 = AN EXTREMELY LARGE PART OF MY JOB

☐ PUBLIC RELATIONS: Meeting with outsiders, going to community functions, making speeches, representing your organization in public, preparing news items for public consumption, etc.

☐ PERSONNEL ADMINISTRATION: Staffing; arranging placement, selection, advancement or training personnel.

☐ CONSULTATION: Gathering, consolidating, interpreting or providing others with facts and information.

☐ LONG RANGE PLANNING: Planning for the future; could include forecasting trends or events, conducting pilot projects, being concerned with legislation which might affect the organization, management development, establishing long range objectives, etc.

☐ CONTROLLING: Controlling resources and/or finances, cost reduction, inventory control, budget preparation, justifying expenditures, defining responsibilities, enforcing regulations, scheduling, drawing up procedures, etc.

☐ DIRECT SUPERVISION: Being directly in charge of workers and the machines or procedures they use.

☐ TECHNICAL ACTIVITY: Using professional tools and techniques including the writing of technical reports.

☐ COORDINATING: Arranging communications between agencies or individuals to assure success on a project or joint venture.

☐ DECISION MAKING: Making decisions on problems requiring authority to resolve; exercising broad power and authority; includes having the authority to obligate the organization.

Other background variables which were studied in relation to job satisfaction and career intent included total months in utilization field, total months in active Federal military service, number of subordinates reporting directly to the respondent, and number of personnel over whom the respondent exercised general responsibility. Officers were also asked to estimate the percentage of work time spent alone in individual effort and that spent in group effort in contact with others. They were asked to rate the degree of administrative versus technical character of their work on a scale from one (almost entirely administrative) to seven (almost entirely technical). Educational level was also assessed on a scale from one (high school graduate) to six (doctor's degree). Utilization of talents and training on the job was assessed on a scale from one (not at all) to seven (perfectly).

The fact that the present research is correlational poses a disadvantage. This type of research does not permit conclusive inferences regarding causal relations among variables. It may, however, be a useful source of hypotheses.

C. CORRELATES OF SATISFACTION AND INTENT ACROSS THREE UTILIZATION FIELDS

In order to perform exploratory research into those correlates of job satisfaction and career intent which are amenable to study via the job inventory approach, correlation coefficients were computed between job type group means. Job type group means for the job satisfaction variable were correlated with group means for other variables; a similar procedure was performed with job type group means for the career intent variable. Since the computations were performed on group means, the resulting product-moment coefficients are probably artificially high; however, for exploratory research, the analyses are intended to indicate possible trends only. A refinement incorporated into the study was the use of partial correlation to control for the influence of tenure.

Tables 21 and 22 illustrate the relationships between background variables and career motivation for officer job types in three utilization fields; only those correlations significant at the 5 percent confidence level or better are presented.

TABLE 21. CORRELATES OF CAREER INTENT ACROSS JOB TYPES IN THREE UTILIZATION FIELDS (PARTIALLED FOR TENURE).

	Transportation (N = 19)	Aircraft Maintenance (N = 23)	Procurement Management (N = 28)
Utilization of Talents & Training	.58**	.54**	.43*
Months in Utilization Field	NS	.41*	NS
Average Percent Time Spent with Others	NS	NS	.44*
Rated Involvement in Direct Supervision	NS	NS	.40*
Rated Involvement In Technical Activity	.48*	NS	NS
Rated Involvement in Coordinating	NS	NS	.49**

* $p < .05$

** $p < .01$

NS (Not Significant)

TABLE 22. CORRELATES OF JOB SATISFACTION ACROSS JOB TYPES IN THREE UTILIZATION FIELDS (PARTIALLED FOR TENURE).

	Transportation (N = 19)	Aircraft Maintenance (N = 23)	Procurement Management (N = 28)
Utilization of Talents and Training	.92**	.71**	.70**
Number of Direct Subordinates	NS	.42*	NS
Median Number of General Subordinates	NS	.42*	NS
Administrative vs. Technical Rating	.40*	NS	NS
Average Percent of Time Spent with Others	-.51**	NS	.45*
Education Level	NS	-.40*	NS
Number of Tasks Performed	NS	.54**	.41*
Rated Involvement in Personnel Administration	NS	.41*	NS
Rated Involvement in Consultation	.57**	NS	NS
Rated Involvement in Controlling	NS	.69**	NS
Rated Involvement in Technical Activity	.64**	NS	NS
Rated Involvement in Coordinating	NS	NS	.42*
Rated Involvement in Decision Making	NS	.65**	.70**

* $p < .05$
** $p < .01$
NS (Not Significant)

D. UTILIZATION OF TALENTS AND TRAINING

A common assertion according to Vroom (1964) is that an individual derives satisfaction from jobs which permit him to use his specific skills and abilities. Thomas (1970) investigated retention of Air Force officers and found several questions dealing with skill utilization to be significantly correlated with career intent.

Table 21 shows in fact that the utilization of talents and training variable was the most highly related to career intent, and the only variable significant across all three utilization fields. Table 22 shows that utilization of talents and training was highly related to job satisfaction and was the only variable significant across all three utilization fields.

Table 23 compares the correlations of utilization of talents and training with both career intent and job satisfaction. It is apparent that while all correlations are significant, utilization of talents and training is more closely related to job satisfaction than to career intent.

A possible explanation for this finding is offered by Vroom (1964). He points out that turnover, or in this case career intent, would be less related to utilization of abilities than would job satisfaction. This is because turnover or career intent is also affected by a number of other variables such as level of employment and availability of other jobs. The utilization of talents and training, however, appears to be the single most important variable related to career motivation.

TABLE 23. CORRELATES OF UTILIZATION OF TALENTS AND TRAINING (PARTIALLED FOR TENURE).

	Transportation (N = 19)	Aircraft Maintenance (N = 23)	Procurement Management (N = 28)
Career Intent	.58**	.54**	.43*
Job Satisfaction	.92**	.71**	.70**

* $p < .05$
** $p < .01$

E. DISCUSSION OF JOB SATISFACTION AND RELATED VARIABLES

Decision Making and Control

A closer examination of Table 22 shows that in the procurement management field, a correlation of .70 was obtained between job satisfaction and the extent to which decision making was part of an officer's job. In the aircraft maintenance field, the correlation between job satisfaction and decision making was .65 and the correlation between job satisfaction and controlling was .69.

Vroom (1964) states that one of the basic assumptions of those associated with the human relations movement is that persons obtain satisfaction from influencing decisions and controlling their work environment. In his review of the literature, he concludes that the satisfaction of subordinates is positively associated with the degree to which they are permitted an opportunity to participate in making decisions. Tannenbaum (1966) also states that studies of organizations are reasonably consistent in showing a positive relationship between job satisfaction and the amount of control a person exercises in his work situation.

Number of Tasks

Another variable which was significantly related to job satisfaction was number of tasks performed. Table 22 shows a correlation of .54 for aircraft maintenance and .41 for procurement management. This finding is generally supported by Walker and Guest (1952) who found that the degree to which employees expressed interest in their jobs was related to the number of operations which they carried out.

Time Spent With Others

Table 22 shows that average percent time spent with others was negatively correlated with job satisfaction in the transportation field and positively correlated in the procurement management field. Vroom (1964) points out that workers' satisfaction with their jobs can be related to their opportunities for interaction with others on the job. It is possible, however, that interaction may lead to the emergence of both positive and negative attitudes. It may be necessary to examine the conditions under which interaction will be rewarding and the conditions under which it will be frustrating. It may be that differing conditions in the two utilization fields affect the relationship between satisfaction and social interaction.

Other Variables

Table 22 shows that other variables such as number of subordinates and the rated involvement in personnel administration, consultation, coordination, and technical activities were all related to job satisfaction. Each of these, however, was significant for only one utilization field.

F. WORK ROLES AND JOB SATISFACTION

It is interesting to note that different patterns of correlates to job satisfaction emerge when the utilization fields are examined individually. It is possible that the factors correlated with job satisfaction will vary depending on the nature of the content and context of the work of officers in different utilization fields.

For example, Table 22 shows that for the transportation field, the more technical the nature of the work performed, the higher the degree of job satisfaction. The less time spent in work with others (or the more time spent working alone), the higher the job satisfaction. The more consultation was rated as part of the job, the higher the degree of satisfaction. The more technical activity was rated as part of the job, the higher the degree of job satisfaction. These relationships taken together suggest that job satisfaction in the transportation field is related to activities usually associated with the role of technical expert.

For the aircraft maintenance field, different variables were significant. As the number of general subordinates increased, the degree of job satisfaction increased. As education decreased, the degree of job satisfaction increased. As personnel administration, controlling, and decision making increased as rated parts of the job, the degree of job satisfaction increased. These relationships, taken together, suggest that job satisfaction in the aircraft maintenance field is related to the activities usually associated with the role of first line supervisor.

Examination of Table 22 for the procurement management field reveals another set of variables to be related to job satisfaction. As time spent with others increased, the degree of job satisfaction increased. As number of tasks performed increased, the degree of job satisfaction increased. As coordinating and decision making increased as rated parts of the job, the degree of job satisfaction increased. These relationships, taken together, suggest that job satisfaction in the procurement management field is related to the activities usually associated with the role of general manager.

These findings suggest a more field-specific approach to understanding the dynamics of officer career motivation which would take differing situational and social circumstances of the jobs into account. Vroom (1964) points out that the relative frequency with which job-content or job-contextual features are mentioned as sources of satisfaction and dissatisfaction is dependent on the nature of the

content and context of the work roles of the respondents.

Dunnette (1966) supports a field-specific notion with his complex model for test validation and selection research. He states that the model makes explicit the necessity for predicting actual job behavior and studying it in the context of different job situations rather than simply contrasting groups formed on the basis of overall organizational outcomes.

G. GRADE LEVEL AND CAREER MOTIVATION

The data presented in Tables 21 through 23 were organized by job types identified by the Air Force method of job analysis. In Tables 24 through 26, career motivation information is grouped according to officer grade. For each utilization field, it was possible to determine the average rated career intent for all second lieutenants, all first lieutenants, etc. The average rated job interest and the rated utilization of talents and training were also calculated for each officer grade. It was possible to allow the examination of career motivation levels for each grade within a utilization field, as well as across utilization fields.

A careful examination of Tables 24, 25, and 26 shows that, while there is a general linear trend of increasing career motivation, there is an important deviation, which is the drop in rated interest, intent, and utilization of talents and training for first lieutenants. Table 24 shows that the critical area of concern for career motivation extends up to the grade of captain, after which nearly 100 percent of officers in grades of major through colonel intend to remain until retirement.

Janowitz et al., (1964) studied Air Force officers by type of commission in February, 1961, and found the data indicated that almost all officers who stay longer than four years have high levels of commitment. Thomas (1970) points out that officers probably experience the greatest alienation or lowest morale and the greatest desire to leave the military during their first few years of active duty.

Vroom (1964) points out that one of the most frequently studied correlates of job satisfaction is job level, and a positive relationship between the level or status of the worker's job and his job satisfaction has been reported by a large number of investigators. While the majority of these studies have been carried out with a civilian population, Porter and Mitchell (1967) have studied Air Force military personnel. The findings showed that fulfillment and satisfaction increased in relation to military rank in the same way as for civilian managers. These findings were based, however, on the following pairings: brigadier generals and colonels, lieutenant colonels and majors, captains and lieutenants.

Shenk (1970) reported the results of a historical study of the 1963-1964 officer input from the principal Air Force commissioning programs. Based on responses to a career in-

TABLE 24. CAREER INTENT*

UTILIZATION FIELD	2nd LT	1st LT	CAPT	MAJ	LT COL	COL
Transportation	56	35	76	99	100	100
Procurement Mgt.	69	45	70	100	100	99
Civil Engineering	48	36	60	98	99	99
Financial	59	49	75	99	97	100
Aircraft Maintenance	57	40	67	100	100	100

* Percent who will or probably will remain in USAF until retirement

TABLE 25. JOB INTEREST*

UTILIZATION FIELD	2nd LT	1st LT	CAPT	MAJ	LT COL	COL
Transportation	5.13	4.69	5.34	5.99	5.96	6.08
Procurement Mgt.	4.71	4.83	5.08	5.70	6.00	5.81
Civil Engineering	4.80	4.74	5.11	5.77	5.83	5.96
Financial	5.22	4.95	5.33	5.89	5.76	6.57
Aircraft Maint.	5.30	4.97	5.31	6.11	6.08	6.22

*Mean Score on 1-7 scale from (1) extremely dull to (7) extremely interesting.

TABLE 26. UTILIZATION OF TALENTS AND TRAINING*

UTILIZATION FIELD	2nd LT	1st LT	CAPT	MAJ	LT COL	COL
Transportation	3.29	3.22	4.21	5.04	4.79	4.72
Procurement Mgt.	3.17	3.60	4.04	4.75	5.27	5.10
Civil Engineering	3.36	3.23	3.60	4.46	4.87	5.47
Financial	4.02	3.80	4.52	5.31	5.00	5.71
Aircraft Maint.	3.38	3.38	4.02	4.95	5.17	5.19

*Mean score on 1-7 scale from (1) not at all to (7) perfectly.

tent statement, there was a gradual trend toward lower career intent through the third year of active duty, after which a gradual increase occurred through the fifth year of active duty. The third year or lowest percentage of favorable career intent statements was 37 percent of officers favorable. A distribution by grade showed that 97.6 percent of third year-officers were first lieutenants.

Herzberg et al., (1957) indicated that morale is high for the typical youthful employee immediately after employment, drops sharply after the first few years, and then begins to climb as he continues to develop occupationally. These investigators proposed that early satisfaction is due to the newness of the job, but dissatisfaction sets in quite rapidly due to the uncertainty and lack of seniority and security.

The present research findings on grade level serve only to point out that the critical rank for instilling career motivation is that of first lieutenant. The research cannot answer the question of whether the finding is due to job-related factors, a general psychological reason such as was proposed by Herzberg, or a possible combination of the two. The research does serve, however, to point out that efforts to increase career motivation might have the most impact if centered on those officers in the grade of first lieutenant.

V. SPECIAL STUDIES

A. COMPILATION OF WRITTEN-IN TASK STATEMENTS

The USAF method of job analysis allows for continued free-response input from participants even after the job inventory format is finalized. It would aid the job-typing process if clerical personnel would type write-ins from job inventory booklets onto the blank side of keypunch cards. The case control number of survey incumbents would be typed at the top of the card(s) for identification. Then, using printouts from the Program PRTVAR which would list KPATH sequence numbers by case control number in consecutive sequence, the corresponding KPATH sequence number would be located and typed at the top of the keypunch card. Next, the KPATH sequence number would be keypunched on each card and the cards could be automatically sorted in order of KPATH sequence.

This procedure would efficiently produce a card deck of write-ins in KPATH sequence. This would allow further descriptions of work performed by members of specified job types.

B. DATA QUALITY

Since the present surveys were conducted with the aid of optically scannable data cards, a comparison of the quality of data received with the data quality of previous efforts utilizing keypunch methods would seem appropriate.

Table 27 shows that non-response to selected items is somewhat increased with the use of the card method; however, the non-response rate is probably still within acceptable limits.

TABLE 27. NON-RESPONSE OF PRESENT AND PAST SURVEY PARTICIPANTS TO SELECTED BACKGROUND QUESTIONS (GRADE, MAJCOM, OR DAFSC) AS AN INDICATOR OF DATA QUALITY.

SOURCE	N	PERCENT OF NON-RESPONSE
Five Present Officer Surveys	4,520	1.95
Five Previous Officer Surveys	3,037	0.72
Five Previous Airmen Surveys	5,380	0.61

C. SIMPLIFIED INSTRUCTIONS AND FORMAT

The instructions for the card method of data collection are long and laborious; many telephone complaints were received with regard to the physical difficulty of completing a card-oriented inventory. Most of the complaints were in regard to the cards themselves rather than the lengthy directions. The card method requires that the respondent look back and forth from card to booklet; apparently, this activity is a source of frustration.

A superior method which removes the frustration of looking from card to booklet and back and which does not require extremely elaborate instructions is the sheet scanning method. Via the sheet scanning method, time spent ratings are made on the sheet which contains the task statements. If optical scanning costs and data quality are similar to those of the card method, the sheet scanning method should prove to be superior in all respects but the following: only one rating factor is allowable with the sheet method.

D. JOB DIFFICULTY RESEARCH

Groundwork was begun in the present study for the future validation of a job difficulty index. The tasks in the transportation job inventory were rated by fifty senior officers on a 1-to-7 job difficulty scale. Sample job descriptions from each of the job types identified by the job analysis procedure were sent to another fifty senior officers, who rank ordered the job descriptions from least to most difficult.

At the same time, an artificial job difficulty index was developed for each survey participant in the transportation field. Grade was chosen as the key variable in the development of the job difficulty index; the six officer grades were coded on a six point scale (2nd Lt. = 1 on up to Col. = 6), and for each task in the inventory the average coded grade value for performing members was computed. The variables on weights so created (the average coded grade value for performing members) were multiplied by computed estimates of percent time spent on each task for each participant. After multiplication by computed estimates of percent time spent, the weights were averaged for each case or participant, summarizing the computations above to one value for each participant. The new value or variable became the job difficulty index.

The hypothesis to be tested in a future analysis will be that the difficulty index will predict the rankings of the individual job descriptions performed by the fifty senior officers.

Preliminary indications of the predictive power of the difficulty index are presented in Table 28. DAFSCs are differentially ordered by the difficulty index in an order which would be expected; i.e., entry level DAFSCs have lower average indices than fully qualified DAFSCs and the lower level DAFSCs have lower indices than the staff officer DAFSCs.

Another method of predicting the rankings of job descriptions on a difficulty basis has been developed for enlisted jobs by Mead and Christal (1970).

One of the chief predictors of Mead and Christal's method is the number of tasks performed per respondent. Preliminary analyses of "number of tasks performed" indicate that this predictor may have a complex relationship with job difficulty in the case of officer fields. Table 29 shows the average grade (computed by averaging individual grade codes with 2nd Lt. = 1 on up to Col. = 6) and the

TABLE 28. POWER OF THE JOB DIFFICULTY INDEX IN DISCRIMINATING DAFSCs IN THE TRANSPORTATION FIELD.

RANGES FOR DIFFICULTY INDEX	DAFSCs (% WITHIN RANGE)											
	6021		6024		6041		6044		6011		6016	
	N	%	N	%	N	%	N	%	N	%	N	%
2.60-2.79	--		--		--		1	(1%)	--		--	
2.80-2.99	19	(90%)	77	(82%)	11	(33%)	22	(13%)	--		5	(3%)
3.00-3.19	2	(10%)	16	(17%)	21	(64%)	111	(64%)	51	(57%)	48	(32%)
3.20-3.39	--		1	(1%)	1	(3%)	27	(15%)	22	(24%)	51	(34%)
3.40-3.59	--		--		--		8	(5%)	12	(13%)	37	(25%)
3.60-3.79	--		--		--		1	(1%)	5	(6%)	7	(5%)
3.80-3.99	--		--		--		0	-	--		2	(1%)
4.00-4.19	--		--		--		1	(1%)	--		--	
TOTAL	21	(100%)	94	(100%)	33	(100%)	171	(100%)	90	(100%)	150	(100%)
MEAN	2.95		2.96		3.04		3.13		3.24		3.30	
S.D.	.04		.07		.08		.15		.17		.18	

TABLE 29. AVERAGE GRADE AND AVERAGE NUMBER OF TASKS PERFORMED FOR EACH JOB TYPE IDENTIFIED IN THE TRANSPORTATION JOB ANALYSIS.

JOB TYPE TITLE	AVERAGE GRADE	AVERAGE NUMBER OF TASKS PERFORMED
Vehicle Operations Officer	1.93	68
Records & Reports Officer	2.00	27
Traffic Management Officer	2.15	110
Protocol Officer	2.15	17
Vehicle Maintenance Officer	2.17	67
OIC, Air Freight	2.37	88
Passenger Services Officer	2.45	64
Traffic Control Officer	2.50	51
Aerial Delivery Officer	2.94	64
Transportation Inspector	3.00	44
Personnel Officer	3.12	20
Station Traffic Officer	3.28	103
Chief of Transportation (Squadron)	3.33	147
Terminal Services Staff Officer	3.80	77
Transportation Squadron Commander	3.96	78
Chief, Traffic Management	4.15	127
Airlift Support Staff Officer	4.29	48
Command Staff Transportation Officer	4.43	87
Plans & Programs Officer	4.47	27

average number of tasks performed for each nineteen job types within the transportation utilization field. Upon inspection of Table 29, it is apparent that members of some low-grade job types perform a large number of tasks and that members of some high-grade job types perform a low number of tasks.

Placing two such job types under closer examination reveals additional information. The Traffic Management Officer (average grade of 2.15), for example, exercises general supervision over forty to fifty personnel, performs an average of one hundred ten tasks, and has 18 percent of his time at work accounted for by his top fifteen tasks.

In contrast, the Airlift Support Staff Offices Officer (average grade = 4.29) exercises general supervision over only five or six personnel, performs an average of forty-eight tasks, and has 27 percent of his time at work accounted for by his top fifteen tasks.

Upon further inspection of the average number of tasks performed by members of job types in the transportation, procurement and aircraft maintenance utilization fields, it is apparent that whether larger numbers of tasks are performed by officers in higher graded job types may depend upon whether the job is staff or line. Preliminary data (summarized in Table 30) show that the correlational relationship between grade and task volume of the job type may be positive if only line positions are considered. Specifically, Table 30 shows that the relationship between grade and number of tasks performed improves positively when staff job types are discarded from analysis.

TABLE 30. GRADE AND TASK VOLUME CHARACTERISTICS OF JOB TYPES WITHIN THE AIRCRAFT MAINTENANCE, PROCUREMENT, AND TRANSPORTATION UTILIZATION FIELDS.

GRADE AND TASK VOLUME CLASSIFICATION OF JOB TYPE GROUPS	BREAKDOWN FOR ALL 70 JOB TYPES WITHIN THE 3 FIELDS	BREAKDOWN FOR MANAGERIAL AND SUPERVISORY JOBS ONLY (EXCLUDING STAFF JOBS) (N = 41)
Less than 3.00 (Capt.) and less than 80 tasks	35%	39%
Less than 3.00 and 80 or more tasks	7%	5%
3.01 or more and less than 80 tasks	32%	17%
3.01 or more and more than 80 tasks	26%	39%
TOTAL	100%	100%

VI. REVISED PROCEDURES FOR CONSTRUCTING OFFICER JOB INVENTORIES AND FOR DETERMINING OPTIMAL BREADTH OF COVERAGE FOR A GIVEN UTILIZATION FIELD

To increase the efficacy of officer surveys, there is a simplistic solution as follows: for the job analyst to work harder, perform more interviews, use a broader range of source documents, contact a larger sample of field reviewers, write more task statements, etc. Constraining the general philosophy of "working harder," however, is the fact that there is probably some optimum level of task specificity and breadth of coverage beyond which the job analyst or inventory constructor should not go. Otherwise, the inventory may become interminably long, or it may have incompatible mixtures of task statements. There should be some attempt in each analysis to verbally reduce each field to some consistent level of basic task elements. The discussion which follows attempts to clarify the issue between "too much" and "too little."

A. CONSTRUCTION PROCEDURES

There is no question but that front-end research is critical in officer job analysis. For the three extra surveys constructed in the present effort (AVIONICS - 40XX, COMPUTER TECHNOLOGY - 51XX, and LOGISTICS - 66XX), extra interviewing was assumed to be necessary from the start. An average of thirty-three officers per field was interviewed in the construction of these three surveys.

In each case, initial interviews were used to determine organizational functions. To some extent, the standard industrial engineering technique of deducing individual tasks from stated organizational function was followed. The industrial engineering approach was not used to phrase task statements; however, it was used to determine areas in which officer tasks would be discovered because of the demands of organizational function. Task phrasings tended to be developed with the latter half of the interviewees, after a functional overview had been obtained by the job analyst from the former half of the interviewees. It would seem that future officer surveys would benefit from a similar interviewing procedure. In addition, help in locating representative interviewees is needed by the job analyst. The best single source of both initial interviews and referrals are the career development officers for each field located at the Military Personnel Center (MPC), Randolph AFB, Texas.

MPC also has central files of representative specialty descriptions for each utilization field. Actual job descriptions, written from the point of view of the using agency, are an extremely valuable source of officer tasks. By reviewing job descriptions ahead of time, job analysts involved in the present effort were able to discover and learn to cope with the fact that large percentages of officers in the computer technology and logistics utilization fields held special category (one-of-a-kind) assignments.

Following the philosophy of finding the right person or persons, field reviews for the three new fields were sent to expert individuals and places with a heavy concentration of experienced individuals, as well as to a random sample of senior officers. Technical training centers continue to be a must for field review of the task statements, also.

In a highly complex field such as computer technology, expert advice is necessary after field reviews are returned. It was extremely difficult to classify new tasks obtained from the computer technology field review without expert assistance.

As a final note toward recommendations on new construction procedures, the question of the utility of a secondary task rating factor must be considered. In complex utilization fields, it is a major effort for an officer to complete the job inventory booklet when rating only one (the time spent) factor. A strategy of indirectly assessing such factors as experience, training needed, or task criticality may prove superior to inclusion of these factors in task rating schemes.

Other guidelines for constructing officer job inventories are difficult to define with precision. The amount of work required to construct a finished job inventory depends upon factors such as the following:

(1) The proportion of officers within the utilization field assigned to special category jobs;

(2) The proportion of officers assigned to project work;

(3) The regional and structural breakdown of the organizational units to which members of the utilization field are assigned;

(4) Whether members of the utilization field are mostly staff or mostly line managers;

(5) The technical-educational preparation required for entry into the utilization field.

Usually the extent of inventory construction effort which will be required is not fully known until the job analyst has spent one to two weeks in on-site interviewing and reading. Inventory construction effort may range from three job analyst man-weeks and ten incumbent interviews to eight analyst man-weeks and thirty incumbent interviews. The task lists produced by publications and interview research should be reviewed by at least fifty additional incumbents for an average utilization field and at least one hundred additional incumbents for a complex field.

The reader is referred to Morsh and Archer (1967) for other details related to inventory construction.

B. OPTIMAL BREADTH OF COVERAGE

After several attempts at developing quantitative elements of "breadth of coverage," it was concluded that the specific nature of each utilization field determines its own "breadth of coverage." There is no discernible formula for constructing task statements reflecting optimal breadth of coverage. As a general, clinical rule, job analysts are generally able to construct the task anatomy of a field with less than 600 task statements. A survey which yielded more than 20 major work areas or more than 50 total job types is too big; in such a situation, the strategy of splitting up the field into subpopulations seems to be the major alternative. A second strategy would be to increase the generality of task statements; however, this approach was used in past attempts at officer job analysis and usually resulted in large numbers of officers being classified similarly rather than differentially.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions and recommendations are presented as follows in the form of answers to the questions submitted in the introduction.

(1) Does a more detailed approach to officer job analysis reflect sub-specialization within utilization fields? Yes. Past surveys tended to use two hundred to four hundred broadly stated, behaviorally oriented task statements. The present approach tended toward the use of four hundred to six hundred more specific task statements with unambiguous verbs and direct objects. The present approach clearly reflected sub-specialization better by producing lower indices of task homogeneity within utilization fields, by causing smaller percentages of incumbent samples to be grouped into large job types, by identifying more job types per utilization field, by reducing the average number of tasks checked per respondent, and by increasing the range of average grade for tasks within a survey.

(2) Does a more detailed approach reflect the task structure and the character of various job types within a utilization field accurately? Yes. Expert career development officers perceived the results of the subsequent job analyses as generally accurate; the same experts also generally agreed as to the existence of the job types identified by the various surveys.

(3) Can special semantic characteristics of task statements which are good discriminators of grade or job type be identified? Generally not. There do not appear to be a class of verbs or direct objects which automatically add to the discrimination power of a task statement. The retention of a group of generally worded "executive" task statements in each inventory is recommended since this type of task statement is more likely to be checked by officers with higher grades. However, the presence of too many generally worded "executive" tasks may dilute the power of the job inventory to discriminate either grade or job type.

(4) Does the inventory method produce data which facilitates the study of complementary topics such as job satisfaction or career intent? Yes. It is possible with the inventory approach to examine and study motivational variables such as satisfaction or intent in relation to biographical and work performance variables.

Exploratory data indicate that whether a certain job element such as the amount of direct supervision performed, the percentage of time available for contact with others, or the number of tasks performed is associated with job satisfaction or career intent depends upon the utilization field. A similar situation exists for background variables such as education, months spent in the utilization field, etc. Again, present data are preliminary and exploratory. However, if further research is supportive, it could lead to separate selection, placement, retention and career development models for each utilization field.

As an important footnote, it should be pointed out that there is presently a drop in career motivations for officers in the grade of first lieutenant. Retention strategies need to target the younger officers.

(5) How can the job inventory method facilitate the study of job difficulty? By enabling the researcher to explore the job difficulty question both rationally and empirically. In the present study, a (rational) experimental difficulty index was generated from a computer program available in the CODAP system. The index was hierarchically related to a DAFSC ordering. Empirically, the present investigators were able to notice a possible moderator of the relationship between number of tasks performed and a measure of job difficulty (grade) because of the availability of data from CODAP outputs. [Future investigators will benefit from searching for more complex relationships between predictors and criteria in the study of job difficulty.] The difficulty levels of staff jobs may require different predictors than the difficulty of line jobs, for example.

(6) What can be done to improve data collection or analysis for job inventories in general?

(a) Basic improvements in job inventory technology could be achieved through the use of a sheet scanning instead of a card scanning procedure. Such a procedure would probably eliminate the use of a secondary rating factor. However, as job inventories become longer, the elimination of a secondary factor would greatly decrease respondent fatigue. Also, the sheet procedure would place the rating on the same sheet as the task and thus further reduce respondent fatigue.

(b) Compilation of written-in statements in KPATH sequence is an aid to job-typing.

(7) How does the job inventory method need to be modified for use with officer populations?

(a) Heavy "front-end" work is needed with officer samples. The job analyst may spend the first week or two in gaining a view of the organizational structure in which incumbents work, in looking at local job descriptions, and in performing general rather than task-oriented interviews. The best single starting place is interviews with career development officers at the Military Personnel Center, Randolph AFB, Texas.

(b) Much of the effort required in conducting the job analysis will depend upon the complexity of the utilization field which is defined by such factors as the percentage of personnel in special category jobs and in project work, the line/staff ratio in the field, and the number of organizational functions for which incumbents have responsibility.

(c) Officer fields are best covered by a maximum rather than a minimum of interviews and field reviews prior to publication of the inventory. It is not unusual for thirty interviews and one hundred field reviews to be required for inventory construction.

(d) The issues of task specificity and optimum breadth of coverage are best resolved for each utilization field on an individual basis.

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